



Economic Impact Analysis Virginia Department of Planning and Budget

12 VAC 5-585 – Department of Health (State Board of) Biosolids Use Regulations August 29, 2002

The Department of Planning and Budget (DPB) has analyzed the economic impact of this proposed regulation in accordance with Section 2.2-4007.G of the Administrative Process Act and Executive Order Number 21 (02). Section 2.2-4007.G requires that such economic impact analyses include, but need not be limited to, the projected number of businesses or other entities to whom the regulation would apply, the identity of any localities and types of businesses or other entities particularly affected, the projected number of persons and employment positions to be affected, the projected costs to affected businesses or entities to implement or comply with the regulation, and the impact on the use and value of private property. The analysis presented below represents DPB's best estimate of these economic impacts.

Summary of the Proposed Regulation

Pursuant to amendments to §62.1-44.19:3 of the Code of Virginia by the 2001 General Assembly, the Board of Health proposes to establish regulations for collection of a biosolids land application fee and for disbursement of the proceeds to localities for testing and monitoring expenses. The proposed fee is \$2.50 per dry ton of biosolids land applied in localities with ordinances. Additionally, the proposed amendments will revise the members of the biosolids use regulations advisory committee.

Introduction

These regulations apply to land application of biosolids. Wastewater treatment of domestic sewage produces raw sludge or sludge containing a variety of trace chemical constituents and microorganisms.¹ Biosolids are the treated form of the sewage sludge generated during wastewater treatment process. Often, the term "biosolids" is used to distinguish it from

¹ Trace chemicals (heavy metals) include arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc.

untreated raw sewage sludge. Because raw sewage sludge contains pathogens, which are disease-causing organisms such as certain viruses, bacteria, and parasites, and because biosolids are derived from sewage sludge, there are potential health risks associated with application of improperly prepared biosolids. The following table provides a partial list of harmful organisms found in raw sewage sludge and the associated diseases and symptoms.

Table: Organisms Found in Municipal Wastewater

	Organism	Disease/Symptoms
Viruses	Hepatitis A virus	Infectious hepatitis
	Echoviruses	Meningitis, paralysis, encephalitis, fever, flu-like symptoms, diarrhea, etc.
Bacteria	Salmonella sp.	Salmonellosis (food poisoning), Typhoid fever
	Escherichia coli	Gastroenteritis
	Shigella sp.	Bacillary dysentery, severe gastroenteritis
Parasites	Entamoeba histolytica	Amoebic dysentery
	Giardia lamblia	Diarrhea, abdominal cramps, weight loss
	Ascaris sp.	Digestive and nutritional disturbances, abdominal pain, vomiting, restlessness, coughing, chest pain, and fever
	Trichuris trichiura	Abdominal pain, diarrhea, anemia, weight loss
	Taxocara canis	Fever, muscle aches, neurological symptoms
	Necator americanus	Hookworm disease

Source: Land Application of Biosolids for Agricultural Purposes in Virginia, G. K. Evanylo, Department of Crop and Soil Environmental Sciences, Virginia Tech.

Untreated sewage sludge also has strong objectionable odors and attracts disease vectors such as flies, mosquitoes, rodents, and birds that can transmit diseases. Finally, pollutants and organisms found in untreated sewage sludge may contaminate surface water, groundwater, and soils and may increase human exposure to health risks.

Because of the vector attraction properties, odors, and the potential harm to human health and to the environment from raw sewage sludge, the use of biosolids is subject to federal and state regulations. For example, Virginia biosolids use regulations contain standards of practice, technical design standards, standards for application rates based on crop needs, and operational requirements. Also, federal regulations establish numerical limits, for metals, dioxin, and dioxin

like compounds in biosolids, pathogen reduction standards, site and crop harvesting restrictions and monitoring, record keeping and reporting requirements for land applied biosolids to protect human health and environment. According to the Environmental Protection Agency (EPA)², the National Academy of Sciences has reviewed current practices, public health concerns and regulator standards, and has concluded that “the use of these materials in the production of crops for human consumption when practiced in accordance with existing federal guidelines and regulations, presents negligible risk to the consumer, to crop production, and to the environment.” Similarly, the Virginia Department of Health (the department) believes that land application of biosolids is a beneficial practice without significant impact on public health or the environment as long as the procedures are conducted according to these regulations.

Once the potential risks are reduced to safe levels by appropriate treatment during the production process, biosolids may have beneficial uses. The beneficial uses arise from mineral and organic matter content of biosolids. Nutrients required for plant growth that can be found in biosolids include nitrogen, phosphorus, potassium, calcium, magnesium, sodium, sulfur, boron, copper, iron, manganese, molybdenum, and zinc.³ Plants simply convert these nutrients in the presence of sunlight into food for animal and human consumption. Thus, if properly prepared, biosolids can replace essential fertilizer elements used for plants to produce food and reduce artificial fertilizer costs. The organic matter in biosolids is a source of nutrients as well, but also a source of soil conditioners. Desired soil characteristics such as tilth, ease of tillage, fitness as a seedbed, impedance to seedling emergence and root penetration, high moisture holding capacity, low soil compaction, low soil acidification, etc. can be improved by biosolids.⁴

Because of these values, biosolids are applied to production of many different types of food, feed, horticultural crops, production of sod and the maintenance of turf, to improve forest productivity, to reclaim and re-vegetate areas disturbed by mining, construction, waste disposal activities, fires, land slides, and other natural disasters. Biosolids are also applied to home lawns and gardens, parks, golf courses, and other similar places where public contact is likely.

² <http://www.epa.gov/owm/mtb/biosolids/genqa.htm>, 08/20/2002.

³ Source: Biosolids Recycling: Beneficial Technology for a Better Environment, U.S. EPA, June 1994.

⁴ Source: Land Application of Biosolids for Agricultural Purposes in Virginia, G. K. Evanylo, Department of Crop and Soil Environmental Sciences, Virginia Tech.

Estimated Economic Impact

Pursuant to amendments to §62.1-44.19:3 of the Code of Virginia by the 2001 General Assembly, the Board of Health proposes to establish regulations for collection of a biosolids land application fee and for disbursement of the proceeds to localities for testing and monitoring expenses. The land appliers of biosolids will provide an advance notice of the estimated fee to the generator, collect the fee from the generator, and remit the fee to the department for disbursement. The department will disburse the remitted fees for reimbursable expenses to localities that adopted ordinances providing for testing and monitoring of land application of biosolids. Reimbursable expenses include charges related to permit application review to identify health risks based on site specific data, charges related to travel, monitoring, inspections, sample collection, delivery and examination of records, charges related to record keeping, complaint and incident response, charges related to biosolids and soil testing, and the charges for the training of local monitors.

The main economic impact of the proposed regulations is the introduction of the biosolids land application fee. The proposed fee is \$2.50 per dry ton of biosolids land applied in localities with ordinances and the fee will be adjusted annually according to the consumer price index. The proposed fee will likely affect both the supply of and the local governments' willingness to allow application of biosolids. The supply may be affected because the fee will be collected from the generator of biosolids. Generators have incentives to produce biosolids because recycling in the form of land application costs less than the alternate methods of disposal such as incineration or land filling. For example, preliminary estimates from two Virginia localities suggest that land application produces savings from \$21.50 to \$35, or in the neighborhood of \$28.25 on average, per wet ton of biosolids when compared to cost of land filling.⁵ Biosolids may be in liquid, dewatered, or dry form. When dewatered biosolids are converted to dry form, the weight loss amounts to approximately 75%.⁶ Thus, one ton of dry biosolids is obtained from about four wet tons. Once the biosolids are produced, a contractor facilitates the disposal and decides whether to landfill, store, or apply to land. In case of land application, the contractor transports biosolids from the generator to permitted application sites. The proposed fee will introduce additional costs to the generator or the contractor. The size of

⁵ Source: Blue Plains Staff Briefing Report, Revised Version, December 19, 2001.

⁶ Source: Virginia Department of Health

the additional costs to the contractor and the generator depends on the contract between them. At the aggregate, the proposed fee will reduce their cost savings from biosolids application by \$0.63 per wet ton, or about 2.2%, and consequently reduce incentives for biosolids production, which may be significant enough to reduce the supply by some amount. Also, some of the proposed fee may be passed down to households in terms of higher sewer bills if a significant portion of the fee is borne by the central sewage system authority.

On the other hand, the proposed fee may increase local governments' willingness to allow application of biosolids. Probably due to the public's perception about the associated risks, and due to absence of funding for testing and monitoring, currently a limited number of localities including Louisa, Culpeper, and Orange provide a local monitor to observe land application of biosolids. Other counties are now developing ordinances and assigning local monitoring duties to county personnel. There are no local monitoring programs that now include sampling and testing. The proposed fee will finance the monitoring expenses incurred by the localities. They will be able to observe the application procedure at the site before, during, and after, verify compliance with the site management practices required for the specific location of the field and the buffer zones from wells and homes. Local monitors may also take samples from the site for testing and the proposed fee can be used to provide training for the monitors to perform these duties and respond to complaints. The ability to test and monitor with reimbursable expenses may reduce some of the public concerns and may result in a more lenient approach to land application of biosolids at the local government level. Additionally, there are incentives in place for farmers to use biosolids in land application. This is because the generator or the contractor usually provides biosolids to farmers free of charge, and the subsequent land application operations produce cost savings from reduced fertilizer and liming needs. With increased monitoring, farmers may also feel that some of the risks are mitigated and more farmers may be willing to land apply biosolids. Partly because more localities may allow land application of biosolids and partly because more farmers may wish to use biosolids, the proposed fee has the potential to increase the use of biosolids in the Commonwealth. Currently, there are 112 permits issued to nine contractors in 42 counties⁷ and at least 20 localities have some type of ordinance addressing biosolids use. The current permits include hundreds of farmers in 42

⁷ Contractors are issued a separate permit for each county.

counties to apply biosolids to about 320,000 acres of farmland. In 2001, 42,000 acres received over 200,000 dry tons of biosolids from Virginia and out of state.

Despite the potential negative effect on the supply, the department believes that the proposed fee will increase the biosolids use in Virginia. Increased application of biosolids would produce some benefits and may increase the risks by some degree. As discussed earlier, the benefits include the value of biosolids as fertilizer, the value as soil amendment, the value of recycling in terms of lower disposal costs and valuable capacity diverted for solid waste, or savings in avoided incineration capacity and risks to environment from incineration. The value of savings from recycling may be uneven among the localities depending on the availability of alternate disposal methods. For example, the department indicates that the City of Richmond has no alternative to recycling due to lack of available landfill capacity and unavailability of the incineration option. In addition, with cost savings from biosolids recycling, localities may devote more resources to nutrient reduction to benefit the Chesapeake Bay watershed. On the other hand, risks to the human health and the environment may increase by some degree if the biosolids are not properly prepared and applied. These risks include health and environmental risks originating from pathogens and pollutants contained in biosolids, vector attraction properties, and strong odor. Application of biosolids may negatively affect individuals close to application site in terms of risks and strong odor and may affect neighboring properties from run off. Super-sensitive individuals and immune deficient individuals may be particularly affected. For example, continuous exposure to strong odor may cause depression and sense of poor health in sensitive individuals, and may aggravate pulmonary illnesses such as asthma.⁸ In 2001, the department investigated about a dozen of complaints related to odors, run off, and feeling ill.

One of the main economic effects of the proposed fee is the transfer of resources from biosolids generators to local governments for testing and monitoring activities. Given the production of approximately 96,750 dry tons of biosolids in the Commonwealth and 118,250 tons of biosolids coming from out of state, about \$242,000 from Virginia generators and \$295,000 from out of state generators will be transferred to local governments in Virginia for testing and monitoring of land application of biosolids. The fee estimate is based on an average amount of 7,984 dry tons of biosolids applied on 1,534 acres per county over 24 counties in

⁸ Source: Virginia Department of Health

2000. Of the total fee, approximately 56.6% will be for labor, 18.3% for overhead, 7.8% for mileage, 15% for analytical expenses, and 3.2% for training expenses required for testing and monitoring activities.⁹ Localities and generators may also realize some cost savings from avoided litigation because local governments may have tendency to ban biosolids if they are not provided resources to test and monitor land applications.

The other expected economic effects are related to proposed fee disbursement and processing methods. Localities will submit documentation of reimbursable testing and monitoring expenses to the department. The department will verify that invoiced costs are reasonable and eligible for reimbursement and make payments to localities on a first-come first-served basis. The department anticipates that one full time employee will be able to facilitate collection of fees and disbursement which is expected to increase costs to the department by about \$50,000 per year including salary, benefits, office space, and other associated costs because these costs will not be paid from the biosolids fee fund. Reimbursable expenses to individual localities will be capped at \$4 per dry ton applied in that locality as a cost containment measure. Since the proposed cap for reimbursable expenses is \$1.50, or 37.5% higher than the proposed fee and the claims up to \$4 per dry ton will be deemed eligible, the fund balance may drop below a level where the fund is no longer sufficient to pay all claims in a specific month. Following reimbursement of the claims to localities up to \$2.50 per dry ton applied in that locality, claims exceeding \$2.50 will be placed on a list monthly and reimbursed according to the priority on the list when there are available funds.

The fact that the proposed cap is currently higher than the proposed fee is expected to produce a number of economic effects. Some of the potential economic effects are related to the uncertainty associated with reimbursement of testing and monitoring costs submitted by a locality exceeding \$2.50 per ton applied in that locality. This uncertainty is expected to produce a number of desirable effects as follows:

1. Localities will be provided incentives not to spend more than \$2.50 per dry ton applied on testing and monitoring because there is chance that a locality may not be reimbursed the costs associated with the level of monitoring above \$2.50 per dry ton. This is likely

⁹ Source: Biosolids Monitoring Program Reimbursable Fee Estimation Model, dated February 15, 2002, Virginia Department of Health.

to provide cost containment incentives for the local monitoring efforts and help prevent fast exhaustion of the fund.

2. With the reimbursement cap, cost containment incentive, the department probably will have to devote less staff time to sort out what is a reasonable expense and what is not. Because the localities may not be reimbursed costs exceeding \$2.50 per dry ton, they are less likely to undertake unreasonable expenses and consequently reduce the department's costs associated with overseeing the fund activity.
3. Fewer incidences of unreasonable expenses will likely reduce disputes between localities and the department and may introduce additional savings to the department through fewer conferences, meetings, and other potential litigation. Since there is uncertainty in reimbursement of costs above the proposed fee collected in that locality, localities are less likely to undertake unreasonable expenses and consequently potential costs to the department associated with hearings and litigation may be averted.
4. The number of allocation decisions that have to be made by the department staff when the funds are not sufficient, may be reduced because the fund is less likely to be exhausted monthly in the presence of a cost containment incentive. This may reduce the department's discretion and leverage over localities. Less discretion and leverage may mitigate the department's liability and associated costs.
5. Fewer incidences of unreasonable expenses may introduce additional savings to localities as well. Most monitoring expenses are irreversible. If the department determines that an expense is unreasonable, the locality may not be able to recover what it already spent. Thus, cost containment incentive provided appears to have the potential to mitigate this problem also by reducing the likelihood of unreasonable expenses being undertaken.
6. The cost containment incentive may enhance incentives to improve monitoring efficiency. With the uncertainty of being reimbursed for expenses above \$2.50 per dry ton, localities are likely to strive to find cheaper methods to achieve the same level of monitoring and be innovative. This will likely create a potential to reduce overall monitoring costs as localities develop new cost efficient monitoring methods and promote them among other localities.

Additionally, the proposed method will allow transfer of fees collected from a locality to another locality if there are available funds in a specific month. This may provide an insurance mechanism for events specific to individual localities. For example, if there is presence of heightened public concern in an individual locality, or heightened violations of regulatory standards and procedures, the locality will be provided an additional chance, contingent upon the availability of funds, to finance the unforeseen monitoring expenses. This will also provide these localities that wish to apply more extensive monitoring a chance to do so to the extent possible with available funding. Finally, reimbursements to a locality for monitoring costs under the proposed method is likely to be commensurate with the perceived level of potential health and environmental risks undertaken by the same locality. The proposed method guarantees the reimbursement of up to \$2.50 per dry ton to a locality. The locality may receive less than \$2.50 per dry ton only if it spends less than the collected fee in that locality. Thus, there is a high chance for a locality to receive reimbursements commensurate with the perceived risks.

However, it is not clear if the expenses for future services promised in contracts would be classified as reasonable and eligible. If they are reasonable, advance reimbursement for future testing and monitoring may provide incentives to increase the speed at which the funds is exhausted to the extent the locality takes the chance of not being reimbursed in a specific month. If they will not be accepted as eligible, the localities may find themselves in breach of the contracts they already signed. These situations could be avoided by clarifying the proposed regulations. Also, the proposed requirement that the department take necessary steps to increase the amount of fee to make sure the localities are reimbursed for the delayed reimbursement claims may promote fee increases over time. Removing the proposed commitment to increase fees whenever the funds are exhausted would likely mitigate this problem. Finally, given the fact that the proposed \$4 cap will not be adjusted according to consumer price index, but the proposed fee will be, the inflation-adjusted fee will exceed the cap for reimbursable expenses in about 32 years at the 2% inflation rate. Unless the proposed language is not revised, the absolute value of the discrepancy between the fee and the cap will be getting smaller during the next 32 years. Once the fee exceeds the cap, there is likely to be uncertainty on whether the inflation-adjusted fee could legally be collected. Revising the proposed language to state that the \$4 cap per dry ton applied in a locality will also be adjusted according to the consumer price index can eliminate this potential problem.

Finally, the proposed amendments include a revised membership for the advisory committee that provides recommendations on issues related to implementation and administration of biosolids regulations in general. According to the department, revised membership will increase the representation of citizens, private agricultural organizations, and soil specialists on the committee. The economic effects of this change will depend on the specific circumstances and the outcomes related to advisory committee recommendations for which no information is available at this time.

Businesses and Entities Affected

The proposed biosolids fee will primarily affect generators, contractor, farmers using biosolids, and local governments. Currently, there are approximately 80 generators, 9 contractors, several thousand farmers, and 42 localities involved with land application of biosolids in Virginia. The owners of neighboring properties where biosolids are land applied and households using centralized sewer systems may also be affected through spillover of negative health and environmental risks from improper application of biosolids and higher sewer bills that may be passed down to households, respectively. A number of service industries, such as restaurants and truck tire retailers, may benefit from the maintenance services necessary to support land application operations.

Localities Particularly Affected

The proposed regulations apply throughout the Commonwealth. About 42 localities have permitted sites for the land application of the biosolids. Additional localities are expected to have permitted sites for land application of biosolids in the future and would need to pass ordinances providing for testing and monitoring in order to be eligible for reimbursements. A number of localities where there are no alternatives to biosolids recycling through land application may particularly benefit from the proposed fee as they may be able to recycle biosolids generated in their jurisdiction in other localities if the proposed fee provides some assurance to other local governments through testing and monitoring and increases the quantity of biosolids recycled in their jurisdictions. For example, the City of Richmond and Henrico County are expected to particularly benefit from the proposed regulations because of limited availability of other disposal alternatives. Arlington County and the cities of Alexandria and Roanoke primarily use land application of biosolids. Also, the Hampton Roads Sanitation

District in southeast Virginia and the regional facilities serving Rockingham County, and Pulaski County, in the western and southwestern areas of Virginia, utilize land application of biosolids.

Projected Impact on Employment

The proposed regulations are anticipated to create the need for one full time position at the department to facilitate the fee disbursement procedure. Local governments' demand for labor may directly increase or may cause an increase in labor demand in the private sector to test and monitor application of biosolids. The training needs for local monitors will be addressed by state agencies and professional organizations such as the Virginia Water Environment Association and may further contribute to demand for labor.

Effects on the Use and Value of Private Property

The proposed regulations have the potential to affect the value and use of farmland where biosolids are applied and of the adjacent properties to application sites. Properly prepared and applied biosolids may enhance the value of farmland through increases in productivity, through reductions in fertilizer costs, or through enhanced soil properties. However, improperly prepared and applied biosolids has the potential to negatively affect the use and value of application sites as well as the nearby properties through, perceived health risks, environmental risks, odor, and increased disease vectors around the site. The local monitors may mitigate the occurrence of nuisance conditions and consequently, the potential negative effects on the value and use of private property located near land application sites.